

This disclosure is intended to explain how to fashion and use various embodiments in accordance with the invention rather than to limit the true, intended, and fair scope and spirit thereof. The foregoing description is not intended to be exhaustive or to limit the invention to the precise form disclosed. Modifications or variations are possible in light of the above teachings. The embodiment(s) was chosen and described to provide the best illustration of the principles of the invention and its practical application, and to enable one of ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims, as may be amended during the pendency of this application for patent, and all equivalents thereof, when interpreted in accordance with the breadth to which they are fairly, legally, and equitably entitled.

15 What is claimed is:

## CLAIMS

1. An antenna system for a communication device, the antenna system comprising:
- an auxiliary antenna within a movable flip housing of the communication device, wherein the auxiliary antenna has a structure comprising an electromagnetic radiator and a coupling probe; and
- a printed circuit board within a main housing of the communication device, wherein the coupling probe couples the auxiliary antenna to the printed circuit board.
2. An antenna system as recited in claim 1 further comprising:
- an antenna coupled to the printed circuit board.
3. An antenna system as recited in claim 1 wherein the auxiliary antenna includes a slot to create the coupling probe.
4. An antenna system as recited in claim 1 wherein the auxiliary antenna comprises an electromagnetically excited radiator created by proximately coupling the coupling probe to the printed circuit board.
5. An antenna system as recited in claim 1 wherein the coupling probe of the auxiliary antenna includes one or more probe dimensions that are used to determine a desired coefficient of coupling between one or more currents within the printed circuit board and the auxiliary antenna, and further wherein the one or more probe

dimensions are chosen from a group consisting of a probe width, a probe diameter, a probe length, a probe spacing and an overlap.

6. An antenna system as recited in claim 1 wherein one or more probe currents  
5 are present within the coupling probe, and further wherein the one or more probe currents radiate in response to the coupling between the coupling probe and the printed circuit board.

7. An antenna system as recited in claim 1 wherein one or more currents are  
10 present within the printed circuit board, and further wherein the one or more currents radiate in response to the coupling between the coupling probe and the printed circuit board.

8. An antenna system as recited in claim 1 wherein the coupling probe and the  
15 printed circuit board together comprise a pair of coupled lines.

9. An antenna system as recited in claim 1, wherein the movable flip housing rotates with respect to the main housing causing a relative position of the coupling probe and the printed circuit board to vary, and further wherein a coefficient of  
20 coupling between the coupling probe and the printed circuit board varies in response to the varying relative position.

10. An antenna system as recited in claim 9 wherein a radiation efficiency of the antenna system varies in response to the varying coefficient of coupling.

11. An antenna system as recited in claim 1, wherein the auxiliary antenna is an antenna selected from a group consisting of an upward slotted auxiliary antenna, a downward slotted auxiliary antenna, and an impedance coupling auxiliary antenna.
- 5 12. An antenna system as recited in claim 1, wherein the printed circuit board is a printed circuit board selected from a group consisting of a main printed circuit board, a downward slotted main printed circuit board, and an upward slotted main printed circuit board.
- 10 13. An antenna system for a communication device, the antenna system comprising:
- an antenna;
  - a printed circuit board coupled to the antenna, wherein the printed circuit board is contained within a main housing of the communication device;
  - 15 a first portion auxiliary antenna contained within a movable flip housing of the communication device; and
  - a second portion auxiliary antenna coupled between the printed circuit board and the first portion auxiliary antenna.
- 20 14. An antenna system as recited in claim 13 wherein the second portion auxiliary antenna is contained within a hinge assembly of the communication device, wherein the hinge assembly couples together the movable flip housing and the main housing.

15. An antenna system as recited in claim 13 wherein the second portion auxiliary antenna includes at least one slot between a first conductive element and a second conductive element to form one or more conductive probes.
- 5 16. An antenna system as recited in claim 15 wherein the first conductive element and a first coupling probe form a first coupling between the first auxiliary antenna portion and the second auxiliary antenna portion.
- 10 17. An antenna system as recited in claim 15, wherein the second conductive element and the printed circuit board form a second coupling between the second auxiliary antenna portion and the printed circuit board.
- 15 18. An antenna system for use within a communication device having a front housing, a rear housing, and a rotating hinge assembly coupled between the front housing and the rear housing, the antenna system comprising:  
an electromagnetic radiator and a coupling probe constructed by adhering metallization onto one or more plastic portions of the rotating hinge assembly.
- 20 19. An antenna system as recited in claim 18 further comprising:  
a metal display shield constructed within the front housing; and  
a connection path between the coupling probe and the metal display shield,  
wherein the connection path is selected from a group consisting of a direct contact in which there is a DC (direct current), an RF connection, and an alternate current radio frequency connection.

20. An antenna system for use within a communication device having a front housing, a rear housing, and a rotating hinge assembly coupled between the front housing and the rear housing, the antenna system comprising:

- an electromagnetic radiator and coupling probe constructed by adhering
- 5 metallization onto a non metallic decorative lens; wherein the non metallic decorative lens is coupled to the rotating hinge assembly.